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REGIONAL EMISSIONS ANALYSIS

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REGIONAL EMISSIONS ANALYSIS

BACKGROUND

SCAG's Regional Travel Demand Model is an advanced four step model that meets and in many cases exceeds the state of the practice. The Model meets all the requirements of the Transportation Conformity Rule, specifically 40 CFR 93.122(b) (see Table 10). The results from the Regional Travel Demand Model are input to the ARB's EMFAC model for calculating regional emissions.

REGIONAL TRAVEL DEMAND MODEL OVERVIEW

SCAG is the primary agency responsible for the development and maintenance of travel demand forecasting models for the SCAG Region. SCAG has been developing and improving these travel demand forecasting models since 1967. SCAG's Modeling Task Force, consisting of modeling technical peers from the various county and state agencies and private firms, meets every other month at SCAG to discuss regionally significant modeling projects and modeling issues, including the development, maintenance, and application of SCAG's Regional Travel Demand Model as well as the travel demand models used by other stakeholders agencies. The SCAG model has undergone periodic peer reviews, the latest occurring in June 2011 (see SCAG Regional Travel Model Enhancement Program and Year 2008 Model Validation Report).

SCAG's regional transportation modeling area covers the entire SCAG region, including Counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. This modeling area is divided into 11,267 Transportation Analysis Zones (TAZs) with an additional 40 external cordon stations, 12 airport nodes, and 31 port nodes for the Ports of Los Angeles and Long Beach. The Model was validated for the Year 2008, which is the base year for the 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (2012-2035 RTP/SCS) (see Year 2008 Model Validation Report).

MODEL INPUTS AND ASSUMPTIONS

SCAG's modeling methodologies, parameters, and inputs are regularly updated to reflect current travel conditions and demographic changes.

Socioeconomic Data by Census Block Group – Socioeconomic data (SED), which describes population, households, and employment at Block Group level, are used as major input to SCAG's Regional Travel Demand Model. The concept is that travel is a derived demand, which is directly related to the demographics and economic characteristics of households. The model uses both aggregate and disaggregate SED. The aggregate data are counts of population, households and employment for each TAZ. The disaggregate data are Public Use Microdata Sample (PUMS) records from the Census, which contain detailed information about person and household characteristics in the region.

Highway Networks – The highway networks were originally developed from the Thomas Brothers GIS database and then updated with street inventory survey data (the latest SCAG region street inventory survey was conducted in year 2008) in the TransCAD environment. The networks include detailed coding of the region's freeway system (mixed-flow lane, auxiliary lane, HOV lane, HOT lane, toll lane, truck lane, etc.) as well as arterials, major collectors, and some minor collectors. Separate highway networks for each time period were developed to simulate time of day differences in roadway capacity and vehicle travel restrictions, such as arterial parking restrictions during peak hours, HOV lane minimum vehicle occupancy requirement, and heavy-duty vehicle restrictions on certain roadways.

Land Use and Accessibility for Auto Ownership Model – Accessibility refers to the ease of reaching goods, services, activities, and destinations. Many factors affect accessibility, including the quality and affordability of transport options, transport system connectivity, and land use patterns. The auto and non-auto accessibilities of a zone directly influence household auto ownership. Land use patterns, in particular high density, mixed-use developments also directly influence household auto ownership.

Land Use, Parking, Pricing, TDM, Walk and Bike for Mode Choice Model – Land use, zonal parking, roadway pricing, and Travel Demand Management (TDM) are inputs to mode choice, in addition to the modal level of service obtained from the highway, transit, and non-motorized networks. Parking fees/restrictions, road pricing cost/policies, and land use densities have direct influence on travelers' mode choice. For example, increasing parking fees encourages travelers to shift from auto to transit. Also, high employment and residential densities encourage the use of transit and non-motorized modes.

Transit Networks – The transit networks include more than 3,300 transit routes/patterns, representing approximately 70 transit operators with fixed route service over the entire SCAG region. The transit routes are completely compatible with the highway geography. Separate transit networks are developed for five time periods based on the transit service information contained in the up-to-date Los Angeles County Metropolitan Transportation Authority (LACMTA) Transit Trip Master database and data collected from transit agencies not included in the TripMaster database. Transit services are grouped into 8 transit modes (Local Bus, Rapid Bus, Express Bus, Bus Rapid Transit (BRT), Transit Way, Urban Rail, Commuter Rail, and High Speed Rail (HSR), according to their service characteristics and fare structures. The transit networks include detailed representation of all rail stations, transfer opportunities among the different modes and between transit routes and park-and-ride locations. A TeleAtlas street network along with Census Block level data is used to calculate walk accessibilities and to develop walk access to transit.

External Trips – External trips (i.e., inter-regional trips) are trips with one or both ends located outside the SCAG modeling area. SCAG's model includes 40 cordon locations consisting of freeways and arterials leading into and out of the SCAG modeling area. A cordon traffic origin-destination survey was conducted in year 2003 and the results were used to develop inter-regional Light and Medium (LM) duty vehicle trip matrices, including External-to-External (E-E), External-to-Internal (E-I), and Internal-to-External (I-E) trips. The origin-destination survey is updated for the 2012-2035 RTP/SCS and 2013 FTIP.

Airport Trips – Airports trips include passenger trips and cargo trips, and are represented by approximately 100 zones in the SCAG modeling area. The daily airport passenger trips are disaggregated into regional model TAZ (using employment data for business trips and household data for non-business trips) and further split into five time periods by four modes of travel: drive alone, 2-person carpool, 3-person carpool, and 4-or-more person carpool. The airport vehicle trips are merged with the other auto vehicle trips prior to the network assignment step. Air cargo truck trips are disaggregated into the regional model TAZs based on the North American Industry Classification System (NAICS) employment data. The daily air cargo trips are split into five time periods by three heavy-duty truck (HDT) types (light HDT, medium HDT, and heavy HDT) and merged with the HDT truck trips prior to network assignment.

Employment, Commodity Flow, Ports, and Warehouse Activities – These inputs to the transportation model are data related to the freight activities, including employment by industrial classification, commodity flows, seaports, warehousing, trucking and wholesale trade, etc.

MODEL MODULES AND PROCEDURES

Household Classification and Population Synthesizer – This module classifies zonal households into several household segments. Prior to the application of Auto Ownership module, households are classified across the following four attributes:

1. Household Size (4 categories): the number of one-person households, two-person households, three-person households, and four or more person households.
2. Number of Workers (4 categories): the number of households with no worker, one worker, two workers, and three workers or more.
3. Household Income (4 categories): the number of households with annual household income (in 1999 dollars) less than $25K (Low), $25K–$50K (Medium), $50K–$100K (High), and $100K or more (Very High).
4. Type of Dwelling Unit (2 categories): single-family detached, and multi-family/attached and group quarters.

For Home-Based-Work (HBW) trip generation, households are aggregated across the dwelling unit type and size attributes, and then further disaggregated into four Age of Head of Household groups (18 to 24 years old, 25 to 44 years old, 45 to 64 years old, and 65 years old or older). The Population Synthesizer is a module that generates a synthetic population by expanding existing disaggregate sample data (from 2000 Census PUMS data) to mirror known aggregate distributions of household and person attributes (from SCAG zonal data). A set of population and household variables of interest are used as control variables in the population synthesizer. A synthetic population is generated for the entire SCAG region using this procedure.

Auto Ownership Model – The auto ownership model provides an estimate of households by auto ownership level (0, 1, 2, 3, 4 or more) for each zone. This information is used in trip generation models to estimate zonal person trips. The basic structure of the auto ownership model is a multinomial logit formulation, using input socioeconomic variables (household size, household income, number of workers, and type of dwelling unit) and land use and accessibility variables (mixed residential and employment, intersection density, transit accessibility, and non-motorized accessibility).

Trip Generation Model – Trip generation is the process of estimating daily person trips generated by (i.e., trip production) and attracted to (i.e., trip attraction) each TAZ on an average weekday. The trip generation model contains 9 trip purposes: home-based work (HBW), home-based school (HBSC), home-based college/university (HBCU), home-based shopping (HBS), home-based social-recreational (HBSR), home-based serving-passenger (HBSP), home-based other (HBO), work-based other (WBO), and other-based other (OBO) trips. HBW trips are further split into 10 types based on trip categories ("Direct" versus "Strategic") and market segmentation (zero car households, households with fewer cars than workers, other households with income less than $25,000, income between $25,000 and $50,000, and income equal to or higher than $50,000). "Direct" homework trips go directly between home and work. "Strategic" home-work trips include one or more intermediate stops between home and work. In total, there are 16 trip types: 8 types for home-based work, and one type for each of the other 8 trip purposes.

Trip Distribution Models – The trip distribution model estimates the number of trips from each TAZ to each other TAZ. Destination choice models are developed for HBW, HBS, HBSR, HBSP, HBO, WBO, and OBO trip purposes while a gravity model approach is used to distribute trips for HBSC and HBCU trip purposes. The trip distribution is estimated as a function of the attractiveness of the destination zone and the travel impedance from origin to destination. The destination choice models include other variables, such as intrazonal indicators, employment or residential density variables, and flags for special generators. For each of the 9 trip purposes, the productions and attractions are split into both peak and off-peak periods.

Mode Choice Models – Mode choice is the process of taking the zone-to-zone person trips by trip purpose from the trip distribution model, and determining how many of these trips are made by various travel modes. The SCAG mode choice model is a nested logit model. The top branch of the nesting structure includes Auto, Transit, and Non-Motorized. The branch under Auto includes Drive Alone and Shared Ride which is further split into 2-person carpool, 3-person carpool, and 4-or-more person carpool. The branch under Transit includes Local Bus, Rapid Bus, Express Bus, BRT, Transit Way, Urban Rail, Commuter Rail, and High Speed Rail (HSR). The branch under Non-Motorized includes Walk and Bicycle. Separate mode choice models are estimated for each trip purpose and time period. Mode choice is a function of level of service attributes (in-vehicle travel time, out-of-vehicle travel time, fares, parking fees, roadway tolls, auto operating costs), household attributes such as income, and zonal attributes such as residential and employment densities.

Heavy Duty Truck (HDT) Model – HDT trucks are defined by ARB as a truck with a gross vehicle weight of 8,500 pounds or more. The SCAG HDT Model includes internal truck and external truck trip models. The internal truck trips are generated using a cross classification method by applying truck trip rates for a two-digit NAICS code by the number of employees in that category and the number of households within each zone. The daily truck trip ends are distributed using a gravity model to create daily truck trips for each of the three truck types: 1) light HDT, 2) medium HDT, and 3) heavy HDT. The external truck trips are developed using an econometric model to estimate inbound and outbound commodity flows by counties. The county to county commodity data are allocated to the zonal level based on NAICS employee distribution and then converted to trucks trips using observed data collected during model development. Seaport and airport related truck trips were included as special generator truck trips. The daily truck trips by truck types are allocated to five time periods and merged with the auto trips in trip assignment.

Network Assignment Model – Network assignment is the process of loading vehicle trips on the appropriate networks. For highway assignment, the Regional Model consists of a series of multi-class simultaneous equilibrium assignments for eight classes of vehicles (drive alone, 2-person carpool using HOV, 2-person carpool using general purpose lanes, 3 or more person carpool using HOV, 3 or more person carpool using general purpose lanes, light HDT, medium HDT, and heavy HDT) and for each of the five time periods. During this assignment process, trucks are converted to Passenger Car Equivalent (PCE) for each link and each truck type based on 1) percentage of trucks, 2) percentage of grade, 3) length of the link, and 4) level of congestion (v/c ratios). Transit vehicles are also included in the highway assignment. For transit trip assignment, the final transit trips from the last loop mode choice models are aggregated by access mode and time period, and then assigned to transit networks for each time period. The vehicle trip tables obtained from mode choice, airport, and heavy duty models are aggregated to the 4,109 Tier 1 zone systems prior to network assignment.

Model Convergence – In order to maintain consistency between the speeds predicted by the highway assignment and the travel times input to the entire travel demand model chain, the predicted speeds are used to re-compute highway and transit travel times, and the entire model sequence are repeated until input and output speeds are consistent with each other.

Highway Performance Monitoring System (HPMS) VMT-based Post-Process – In this step, the outputs from the Network Assignment Model, which including traffic volumes, speeds, Vehicle Miles Traveled (VMT), Vehicle Hours Traveled (VHT), and Vehicle Hours of Delay (VHD) are adjusted so that the base-year model VMT by air-basin by county is consistent with HPMS VMT as appropriate.

MODEL OUTPUTS

Population Synthesizer Outputs – The synthetic households by Number of Workers, Household Size, Household Income, and Type of Dwelling Unit, and a separate classification of households by Number of Workers, Age of Household Head, and Household Income are the outputs from the Population Synthesizer module and the inputs to the Trip Generation Model.

Auto Ownership Model Outputs – The auto ownership model generates households by auto ownership, in other words, the number of households with 0 car, 1 car, 2 cars, 3 cars, and 4 or more cars for each zone, which are the inputs to the Trip Generation Model.

Trip Generation Model Outputs – The output from trip generation model includes person trip tables by 9 trip purposes, of which HBW trips are further split into 8 types by 4 income groups and Direct/Strategic categories for both peak and off-peak periods. These 32 person trip tables are used individually in the Trip Distribution step.

Trip Distribution Model Outputs – The Trip Distribution Model distributes person trips from each trip production zone to each and every attraction zones, resulting in 32 person trip Production/Attraction (PIA) matrices, which are the inputs to the Mode Choice Model.

Mode Choice Model Outputs – The outputs from the Time of Day Model include passenger vehicle trip matrices in OD format by time period and occupancy level. These matrices are then combined with external trips, airport trips, and HDT trips to produce final vehicle OD matrices (3 passenger vehicle classes and 3 HDT classes in 5 time periods) for the Network Assignment step. The 3 passenger vehicle classes are drive alone, 2-person carpool, and 3-person carpool. The 3 HDT classes are light HDT, medium HDT, and heavy HDT. Transit person trips matrices for each of five time periods are also produced in this step for transit assignment.

Network Assignment Model Outputs – Major outputs of the Network Assignment Model are highway and transit level of service attributes, including traffic flows and the associated speeds, VMT, VHT, and VHD on the highway networks as well as transit boarding and passenger loads on each transit line for each time period.

2013 FTIP MODELING ASSUMPTIONS

Socio-Economic Data – Tables 1 and 2 show population and employment summaries by county and air basin which reflect current trends. This forecast has been in development since 2010 under direction from the SCAG's Regional Council Community, Economic and Human Development Policy (CEHD) Committee and in collaboration with SCAG's subregions and local jurisdictions. The process involved several major steps outlined as follows:

1. Analysis of regional growth trends and estimates from sources ranging from the U.S. Departments of Commerce, Health and Human Services, Bureau of Labor Statistics and Internal Revenue Service and the California Department of Finance and Employment Development Department.
2. Analysis of key assumptions (fertility rate, mortality rate, net immigration, labor force rates, headship rates, etc.) and methodologies (cohort-component and shiftshare models).
3. Review and feedback by SCAG's Plans and Programs Technical Advisory Committee, three Panel of Forecasting Experts, counties, subregions and cities including subregional workshops and one-on-one meetings.

The comprehensive discussion of the socio-economic data is included in the 2012-2035 RTP/SCS Growth Forecast Report.

Table 1 Summary of Population Data

County	Air Basin	2008	2012	2014	2020	2023	2030	2035
Imperial	SSAB	170,000	185,000	200,000	244,000	253,000	273,000	288,000
Los Angeles	SCAB	9,398,000	9,550,000	9,648,000	9,937,000	10,108,000	10,502,000	10,781,000
	MDAB	373,000	397,000	413,000	459,000	477,000	530,000	565,000
Orange	SCAB	2,989,000	3,070,000	3,119,000	3,266,000	3,310,000	3,411,000	3,421,000
Riverside	SCAB	1,683,000	1,786,000	1,842,000	1,994,000	2,088,000	2,304,000	2,460,000
	MDAB	28,000	34,000	38,000	48,000	53,000	65,000	73,000
	SSAB	418,000	462,000	486,000	553,000	602,000	719,000	803,000
San Bernardino	SCAB	1,510,000	1,560,000	1,592,000	1,684,000	1,738,000	1,865,000	1,956,000
	MDAB	506,000	531,000	547,000	591,000	630,000	722,000	788,000
Ventura	SCCAB	813,000	839,000	852,000	890,000	903,000	936,000	959,000
SCAG Region	SSAB	588,000	647,000	686,000	797,000	854,000	993,000	1,091,000
	SCAB	15,580,000	15,966,000	16,201,000	16,881,000	17,245,000	18,083,000	18,618,000
	MDAB	907,000	962,000	998,000	1,098,000	1,160,000	1,317,000	1,425,000
	SCCAB	813,000	839,000	852,000	890,000	903,000	936,000	959,000
Total		**17,890,000**	**18,410,000**	**18,740,000**	**19,670,000**	**20,162,000**	**21,330,000**	**22,090,000**

Rounded to nearest thousand

TABLE 2 Summary of Employment Data

County	Air Basin	2008	2012	2014	2020	2023	2030	2035
Imperial	SSAB	62,000	66,000	81,000	102,000	107,000	117,000	121,000
Los Angeles	SCAB	4,244,000	4,125,000	4,263,000	4,440,000	4,513,000	4,638,000	4,678,000
	MDAB	92,000	89,000	92,000	112,000	120,000	137,000	144,000
Orange	SCAB	1,624,000	1,510,000	1,535,000	1,626,000	1,651,000	1,738,000	1,779,000
Riverside	SCAB	495,000	484,000	574,000	709,000	768,000	887,000	933,000
	MDAB	7,000	7,000	8,000	11,000	12,000	14,000	14,000
	SSAB	162,000	158,000	187,000	220,000	239,000	279,000	295,000
San Bernardino	SCAB	591,000	568,000	619,000	676,000	723,000	824,000	868,000
	MDAB	110,000	106,000	115,000	136,000	149,000	177,000	191,000
Ventura	SCCAB	348,000	337,000	355,000	382,000	391,000	408,000	413,000
SCAG Region	SSAB	224,000	224,000	268,000	321,000	346,000	396,000	416,000
	SCAB	6,954,000	6,687,000	6,991,000	7,451,000	7,655,000	8,087,000	8,257,000
	MDAB	209,000	202,000	215,000	259,000	280,000	328,000	350,000
	SCCAB	348,000	337,000	355,000	382,000	391,000	408,000	413,000
Total		**7,740,000**	**7,450,000**	**7,830,000**	**8,410,000**	**8,672,000**	**9,220,000**	**9,440,000**

Rounded to nearest thousand

Networks – A summary of the transportation system attributes for the highway and transit networks for Years 2008 to 2035 are shown in Tables 3, 4 and 5. Lane mile data includes freeway to freeway connectors. Other freeway ramps, freeway Type 3 lanes, and centroid connectors are not included. Note that values in the tables in this report may not add exactly due to rounding. A detailed list of modeled projects is in the Modeling List Appendix.

TABLE 3 Summary of Highway Network Lane Miles

Network	Freeway/Toll	HOV/HOT	Arterials	Collectors	Total
SCAB					
2008	8,101	859	28,487	7,252	44,699
2012	8,172	923	28,764	7,269	45,128
2014 No Build	8,182	974	28,768	7,395	45,319
2014 Build	8,287	973	28,983	7,396	45,639
2020 No Build	8,326	1,023	28,845	7,426	45,620
2020 Build	8,667	1,326	30,230	7,749	47,972
2023 Build	8,772	1,387	30,403	7,761	48,323
2030 No Build	8,352	1,023	28,845	7,426	45,646
2030 Build	8,991	1,470	30,697	8,037	49,195
2035 No Build	8,352	1,023	28,845	7,426	45,646
2035 Build	9,248	1,582	31,171	8,143	50,144
SCCAB					
2008	503	0	1,852	684	3,039
2012	527	0	1,879	680	3,086

Network	Freeway/Toll	HOV/HOT	Arterials	Collectors	Total
2014 No Build	527	0	1,879	684	3,090
2014 Build	527	0	1,899	684	3,110
2020 No Build	527	8	1,895	695	3,125
2020 Build	553	8	1,915	695	3,171
2023 Build	553	8	1,928	695	3,184
2030 No Build	527	8	1,895	695	3,125
2030 Build	553	8	1,951	695	3,207
2035 No Build	527	8	1,895	695	3,125
2035 Build	553	8	1,951	695	3,207
MDAB					
2008	1,873	23	4,637	6,243	12,776
2012	1,874	23	4,710	6,291	12,898
2014 No Build	1,874	23	4,725	6,280	12,902
2014 Build	1,891	23	4,849	6,319	13,082
2020 No Build	1,875	23	4,742	6,280	12,920
2020 Build	2,119	69	5,746	6,524	14,458
2023 Build	2,119	69	5,801	6,526	14,515
2030 No Build	1,875	23	4,749	6,280	12,927
2030 Build	2,208	78	5,831	6,708	14,825
2035 No Build	1,875	23	4,749	6,280	12,927

Network	Freeway/Toll	HOV/HOT	Arterials	Collectors	Total
2035 Build	2,208	81	5,843	6,840	14,972
SSAB (Coachella)					
2008	388	0	1,373	791	2,552
2012	388	0	1,417	803	2,608
2014 No Build	388	0	1,418	810	2,616
2014 Build	388	0	1,473	808	2,669
2020 No Build	388	0	1,420	810	2,618
2020 Build	393	0	1,668	895	2,956
2023 Build	393	0	1,700	922	3,015
2030 No Build	388	0	1,420	810	2,618
2030 Build	423	0	1,793	1,001	3,217
2035 No Build	388	0	1,420	810	2,618
2035 Build	423	0	1,784	1,039	3,246
SSAB (Imperial)					
2008	379	0	1,068	2,464	3,911
2012	380	0	1,119	2,451	3,950
2014 No Build	380	0	1,117	2,452	3,949
2014 Build	380	0	1,120	2,451	3,951
2020 No Build	380	0	1,113	2,465	3,958
2020 Build	380	0	1,157	2,463	4,000

Network	Freeway/Toll	HOV/HOT	Arterials	Collectors	Total
2023 Build	380	0	1,159	2,463	4,002
2030 No Build	380	0	1,113	2,464	3,957
2030 Build	417	0	1,160	2,463	4,040
2035 No Build	380	0	1,113	2,464	3,957
2035 Build	418	0	1,184	2,453	4,055
Total SCAG Region					
2008	11,244	882	37,417	17,434	66,977
2012	11,341	946	37,889	17,494	67,670
2014 No Build	11,351	997	37,907	17,621	67,876
2014 Build	11,473	996	38,324	17,658	68,451
2020 No Build	11,496	1,054	38,015	17,676	68,241
2020 Build	12,112	1,403	40,716	18,326	72,557
2023 Build	12,217	1,464	40,991	18,367	73,039
2030 No Build	11,522	1,054	38,022	17,675	68,273
2030 Build	12,592	1,556	41,432	18,904	74,484
2035 No Build	11,522	1,054	38,022	17,675	68,273
2035 Build	12,850	1,671	41,933	19,170	75,624

TABLE 4 Summary of Transit Route Pattern Miles (Peak Period)

Network	Local Bus	Express Bus	Rail	HSRT	Total
2008	23,431	5,942	3,070	0	32,442
2012 Build	23,441	6,019	3,088	0	32,548
2014 No Build	23,481	5,942	3,136	0	32,558
2014 Build	23,520	6,066	3,136	0	32,722
2020 No Build	23,481	5,942	3,153	0	32,575
2020 Build	23,668	6,066	3,208	0	32,942
2023 Build	23,668	6,066	3,215	0	32,950
2030 No Build	23,481	5,942	3,153	0	32,575
2030 Build	23,748	6,259	3,524	0	33,531
2035 No Build	23,481	5,942	3,153	0	32,575
2035 Build	25,030	7,143	3,415	184	35,773

TABLE 5 Summary of Transit Service Miles

Network	Local Bus	Express Bus	Rail	HSRT	Total
2008	646,939	113,275	32,431	0	792,646
2012 Build	647,426	116,971	34,937	0	799,334
2014 No Build	651,039	113,275	35,513	0	799,827
2014 Build	653,522	123,133	35,513	0	812,169
2020 No Build	651,039	113,275	38,318	0	802,632
2020 Build	662,936	123,133	44,549	0	830,619
2023 Build	662,936	123,133	45,266	0	831,336
2030 No Build	651,039	113,275	38,318	0	802,632
2030 Build	668,111	132,429	67,178	0	867,718
2035 No Build	651,039	113,275	38,318	0	802,632
2035 Build	716,867	159,686	70,240	5,719	952,511

Work-at-Home and Telecommuting – Home-Based-Work trips were reduced for Work-at-Home and Telecommuting. In year 2000, Work-at-Home trips were 3.58 percent and Telecommute trips were 3.34 percent for a total Home-Based-Work trip reduction of 6.92 percent. Trip rates used in trip generation are based on the 2000 Travel Survey. Table 6 below shows the total reductions to the home-based-work person trips over the 2000 base as applied in the trip generation model.

Table 6 Total Home–Based-Work Person Trip Reductions

Category	2000	2008	2012	2014	2020	2023	2030	2035
Work-at-Home	3.58%	4.41%	4.62%	5.03%	5.65%	5.97%	6.69%	7.21
Telecommute	3.34%	3.73%	4.74%	5.86%	11.10	11.27%	13.51	14.90
Total Trip Reductions	6.92%	8.14%	9.36%	10.89	16.75	17.74%	20.20	22.11
Increase over 2000 Base	0.00%	1.22%	2.44%	3.97%	9.83%	10.82%	13.28	15.19

Auto Operating Cost – There are two components used in calculating auto operating cost: the cost of gasoline and "other" costs. The "other" costs category includes costs for repairs, light maintenance, lubrication, tires, and accessories. The assumption used in the modeling work is that if an auto is available at the household then the depreciation of the car and the insurance costs are already being paid for whether the car is left at home or used for commuting to work. Table 7 lists the auto operating costs used for 2012-2035 RTP/SCS and 2013 FTIP. All costs are in 1999 constant dollars. Note: costs are expressed in 1999-dollar values for input into the mode choice models. Auto Operating costs are calculated using the following formula: Auto Operating Cost = Fuel Cost / Fuel Economy + Other Costs.

Table 7 Auto Operating Costs

Category	2008	2012	2014	2020	2023	2030	2035
Auto Operating Cost *	20.63	21.58	22.05	23.47	23.53	23.67	25.77

** Cents/mile; year 1999 constant $. 2035 includes a two cents VMT fee.*

Transit Fares – The transit network includes three types of transit fares: base boarding fares, zone fares, and transfer fares; and two types of fare factors: base fare factor and transfer fare factor. Fare values were collected through the Transit Level of Service Data Collection program. Considering the complex fare structure for most carriers, only published full cash fares for initial boarding and transfers are used to represent the base fare and transfer fare. To account for the revenue composition of different fare types, such as one-way walkup fares, daily/weekly/monthly passes, Senior/Student/Disabled fares, and other special fares, base fare factors and transfer fare factors are estimated from the boarding and revenue data provided by transit operators. By applying fare factors to the published full cash fare, the resulting fares represent actual fares paid by an average passenger. Finally, all boarding fares (base fare and

transfer fare) are converted into 1999 dollars using a CPI adjustment factor derived from the CPI factor published by the US Department of Labor for the Los Angeles-Riverside-Orange County metropolitan area.
The fare structure varies significantly by operator and by service for the same operator. For example, LACMTA has both local and express bus service. For local bus, the general fare is a flat rate of $1.25. For express bus, there is a surcharge of $0.60 for each zone in addition to the $1.25 fare. However, OCTA, another major operator in the region, charges a general fare of $1.50 for local bus. For express bus, the fare is a flat rate of $3.00 or $4.50 depending on the route. To accommodate variations in the fares for different routes, the transit network codes general flat fares (i.e., base fares, transfer fares) at the route level, while the fare factors are calculated at the carrier level.

Two other major operators, Metrolink and Amtrak, follow a zone-based fare structure. For example, Metrolink fares are calculated with a distance-based formula using the shortest driving distance between stations, with an 80-mile maximum charge. To capture the published cash fare between two station pairs, a fare matrix was developed for Metrolink and Amtrak. Similarly, the LACMTA Express bus and Los Angeles Department of Transportation (LADOT) Commuter Express bus that have zone-based fare are also included as a zone-to-zone fare matrix. Similar to the development of fare factors for flat-rate routes, a fare factor matrix was developed based on Metrolink sales and boarding data to represent the weighted average fare for each station pair. In addition, regression analysis was conducted to generate the relationship between the distance and fares for Metrolink to predict future fares for new stations.

No real cost increase in transit fares was assumed from 2008 to 2035.

Non-Motorized Trips – 2035 Plan scenario assumes that there will be a shift of approximately one percent of the motorized trips to non-motorized forms of travel (i.e., walking and bicycling) due to the RTP's investment in active transportation.

Capacity and Free Flow Speed – Highway capacities (including for heavy duty truck) used in the Model for each of the facility types vary, depending on area location (i.e., CBD, urban, suburban, rural, or mountain) (see Table 8 below). Free flow speeds are based on posted speeds.

Table 8 Highway Capacities and Free Flow Speeds Used in the Model

Facility Type	Vehicles / Lane / Hour	Free Flow Speed (MPH)
Freeway (MF, HOV)	1,900 – 2,100	60 – 75
Principal Arterial	475 – 975	21 – 56
Other Arterial	475 – 975	19 – 55
Collector	375 – 975	17 – 52

Toll Roads – There were approximately 325 lane miles of toll roads in 2008, increasing to about 1,600 toll/HOT lanes in 2035. This includes a regional Express Lane network (Table 9) that would build upon the success of the 91 Express Lanes and Transportation Corridor Agencies (TCA) Toll Roads in Orange County and two demonstration projects in Los Angeles County.

The effect of the toll charges on the toll roads was incorporated into the highway assignment procedure. The toll charge was added to each toll facility by inserting the cost to the appropriate link and identifying the link with a unique Toll Class Number. Toll costs (in 1999 dollars) were converted to a time value (in minutes) in the network assignment step.

Table 9 Express/HOT Lane Network

County	Route	From	To
Los Angeles	I-405	I-5 (North SF Valley)	LA/OC County Line
Los Angeles	I-110	Adams Blvd (s/o I-10)	I-405
Los Angeles	I and SR-110	Adams Blvd	US-101
Los Angeles	US-101	SR-110	I-10
Los Angeles	I-10	US-101	I-710
Los Angeles	I-10	I-710	I-605
LA, Orange	SR-91	I-110	SR-55
LA, SB	I-10	I-605	I-15
Orange	I-405	LA/OC Line	SR-55
Orange	I-5	SR-73	OC/SD County Line
Orange	SR-73	I-405	MacArthur
Riverside	SR-91	OC/RV County Line	I-15
Riverside	I-15	Riv/SB County Line	SR-74
Riverside	I-15	SR-74	Riv/SD County Line
San Bernardino	I-10	I-15	SR-210
San Bernardino	I-10	SR-210	Ford St
San Bernardino	I-15	SR-395	Sierra Ave
San Bernardino	I-15	Sierra Ave	6th St
San Bernardino	I-15	6th St	Riv/SB County Line

ITS – The speeds and capacities on Smart Streets were increased by 5 percent to reflect the improved traffic flow due to the Advanced Transportation Technologies/Intelligent Vehicle Highway System (ATT/IVHS).

Conformity requirements – Table 10 below is a summary of the conformity requirements related to travel demand model and how SCAG's regional travel demand model satisfies these requirements.

Table 10 Conformity Requirements Related to Travel Demand Model

CFR	Requirement	How Requirement is Satisfied
93.122(b)(1)(i)	Network-based travel models must be validated against observed counts (peak and off-peak, if possible) for a base year that is not more than 10 years prior to the date of the conformity determination. Model forecasts must be analyzed for reasonableness and compared to historical trends and other factors, and the results must be documented.	The SCAG travel demand models were estimated and calibrated using data from SCAG's Year 2000 Post-Census Regional Travel Survey, 2003 External Travel Survey, the 2010 US Census and various Transit on-board Surveys. The model was validated against 2008 ground counts and 2008 HPMS data.
93.122(b)(1)(ii)	Land use, population, employment, and other network-based travel model assumptions must be documented and based on the best available information.	All land use, population, households, employment, and network-based model assumptions were updated for 2012-2035 RTP/SCS and 2013 FTIP and documented in 2012-2035 RTP/SCS Growth Forecast Report and this Conformity Report.
93.122(b)(1)(iii)	Scenarios of land development and use must be consistent with the future transportation system alternatives for which emissions are being estimated. The distribution of employment and residences for different transportation options must be reasonable.	Land development and use are consistent with future transportation systems. The distribution of employment, population, and household is reasonable with respect to the transport systems.
93.122(b)(1)(iv)	A capacity-sensitive assignment methodology must be used, and emissions estimates must be based on a methodology which differentiates between peak and off-peak link volumes and speeds and uses speeds based on final assigned volumes.	The SCAG travel demand model includes separate multi-modal user equilibrium assignments for peak and off-peak time periods. The network assignments are capacity-sensitive. Link speeds are calculated based on final assigned volumes.
93.122(b)(1)(v)	Zone-to-zone travel impedances used to distribute trips between origin and destination pairs must be in reasonable agreement with the travel times that are estimated from final assigned traffic volumes. Where use of transit currently is anticipated to be a significant factor in satisfying transportation demand, these times should also be used for modeling mode splits.	The SCAG travel demand model includes full feedback of travel time among trip generation, trip distribution, mode choice, and trip assignment steps. Both highway and transit times are included in the mode choice model.

SUMMARY OF REGIONAL VEHICLE MILES TRAVELED

Table 11 below is a summary of VMT in 1,000-mile increments by air basin. VMT data were produced from the SCAG Regional Travel Model and does not include VMT from school buses, urban buses, and motor homes (non-modeled). These non-modeled VMT were provided by the ARB and are included in the emissions analysis.

Table 11 VMT Summary (in Thousands)

AIR BASIN	L&MD	HD	TOTAL	L&MD	HD	TOTAL
	2008			**2012**		
SCCAB	18,679	954	19,633	18,878	953	19,831
SCAB	355,042	21,724	376,766	355,244	20,418	375,662
MDAB	27,822	5,028	32,850	28,891	5,318	34,209
SSAB	14,100	2,494	16,594	15,408	2,559	17,967
Total	415,642	30,201	445,843	418,421	29,248	447,669
	2014 NO-BUILD			**2014 BUILD**		
SCCAB	19,361	987	20,348	19,179	992	20,171
SCAB	363,827	21,276	385,103	361,459	21,392	382,851
MDAB	30,018	5,561	35,579	29,852	5,575	35,428
SSAB	16,968	2,783	19,750	16,813	2,782	19,595
Total	430,174	30,607	460,781	427,303	30,741	458,044

AIR BASIN	L&MD	HD	TOTAL	L&MD	HD	TOTAL
	2020 NO-BUILD			**2020 BUILD**		
SCCAB	19,932	1,157	21,089	19,266	1,119	20,385
SCAB	377,194	25,050	402,244	364,993	24,783	389,777
MDAB	34,284	6,385	40,669	34,230	6,666	40,896
SSAB	19,426	3,533	22,958	18,886	3,481	22,367
Total	450,835	36,125	486,960	437,375	36,049	473,424
	2023 BUILD			**2030 NO-BUILD**		
SCCAB	19,049	1,174	20,224	20,399	1,350	21,749
SCAB	367,525	25,316	392,841	392,250	30,896	423,146
MDAB	35,220	7,213	42,433	41,365	9,248	50,613
SSAB	19,570	3,926	23,496	23,064	5,052	28,117
Total	441,364	37,631	478,995	477,078	46,546	523,625
	2030 BUILD			**2035 NO-BUILD**		
SCCAB	19,622	19,622	19,622	20,833	1,487	22,320
SCAB	389,184	389,184	389,184	402,239	35,505	437,744
MDAB	40,530	40,530	40,530	44,810	11,661	56,471
SSAB	22,285	22,285	22,285	24,630	5,767	30,397

AIR BASIN	L&MD	HD	TOTAL	L&MD	HD	TOTAL
Total	471,619	471,619	471,619	492,513	54,420	546,932
	2035 BUILD					
SCCAB	19,089	1,498	20,588			
SCAB	380,976	33,802	414,779			
MDAB	42,622	12,065	54,687			
SSAB	22,711	5,762	28,472			
Total	465,398	53,127	518,525			

2013 FTIP REGIONAL EMISSIONS ANALYSIS

EPA's Transportation Conformity Rule requires that the 2013 FTIP regional emissions be consistent with (i.e., not exceed) the motor vehicle emissions budgets in the applicable SIPs. Consistency with emissions budgets must be demonstrated for each year that the applicable emissions budgets are established, for the transportation planning horizon year, and for any milestone years as necessary so that the years for which consistency is demonstrated are no more than ten years apart. Where there are no EPA approved SIP budgets, an interim emission test is used for conformity. For the interim emissions tests, the build scenario's emissions must be less than or equal to the no-build scenario's emissions and/or the build scenario's emissions must be less than or equal to the base year. Listed below is a description of the various network scenarios.

2013 FTIP Conformity Base Year – The conformity base year for 8-hour ozone and PM2.5 is 2002; for all other pollutants the conformity base year is 1990.

2013 FTIP No Build – The "No Build" scenario includes all existing regionally significant highway and transit projects, all ongoing TDM or Transportation System Management (TSM) activities, and all projects which are undergoing right-of-way acquisition, are currently under construction, have completed the NEPA process, or are in the first year of the previously conforming FTIP (2011).

2013 FTIP Build – The "Build" scenario is generally defined as all FTIP projects, including the 2013 FTIP No Build, and the future transportation system that will result from full implementation of the 2013 FTIP and the 2012-2035 RTP/SCS.

For more specific individual project information as part of the FTIP modeling and regional emissions analysis, refer to the 2013 FTIP Modeled Projects list (pg II-41).

Section 93.122(d)(2) of the EPA Transportation Conformity Rule requires that in PM non-attainment and maintenance areas for which the SIPs identify construction-related fugitive dust as a contributor to the area problem, the regional emissions analysis should include construction-related fugitive PM. Of the SCAG PM non-attainment areas, only the SCAB and the Coachella Valley portion of SSAB have PM SIPs. The relevant emissions budgets for these two areas include construction emissions, and the 2013 FTIP PM regional emissions analyses include construction emissions as appropriate.

The on-road motor emissions estimates for the 2013 FTIP were analyzed using the EMFAC2007 emission model developed by ARB. For paved road dust, SCAG uses the approved South Coast AQMD methodology, which uses EPA's AP-42 for the Base Year and a combination of additional growth in center-line miles and VMT for future years.

REQUIRED REGIONAL EMISSIONS TESTS FOR 2013 FTIP

The required regional emissions tests for the 2013 FTIP are presented in Table 12. Since transportation conformity findings are needed out to the RTP's horizon year (i.e. 2035), the latest budget years deemed adequate by U.S. EPA serve as the budgets for future years in each emissions test.

Table 12 Required Regional Emissions Test for 2013 FTIP

Year	8-hr Ozone	$PM_{2.5}$	PM_{10}	CO	NO_2
2012	CV	SC			
2014	CV, IMP, SC, VEN, WMD	IMP*, SC	CV, IMP*, MD*, SC		SC
2015**				SC	
2017**	SC				
2020	CV, IMP, SC, VEN, WMD	IMP*, SC	CV, IMP*, MD*, SC	SC	SC
2023	SC				
2030	CV, IMP, SC, VEN, WMD	IMP*, SC	CV, IMP*, MD*, SC	SC	SC
2035	CV, IMP, SC, VEN, WMD	IMP*, SC	CV, IMP*, MD*, SC	SC	SC

SC = South Coast Air Basin; CV = Coachella Valley (SSAB); VEN = Ventura County (SCCAB); WMD = Western Mojave (Antelope/Victor Valleys); MD = Mojave Desert (San Bernardino Portion and Searles Valley portions); IMP Imperial County (SSAB);
** Build/No-Build test (all other are budget tests); ** Interpolated per conformity rule.*

SUMMARY OF REGIONAL EMISSIONS ANALYSIS

The following tables summarize the required regional emission analyses for each of the non-attainment areas within SCAG's jurisdiction. For those areas which require budget tests, the FTIP emissions values in the summary tables below utilize the rounding convention used by ARB to set the budgets (i.e., any fraction rounded up to the nearest ton), and are the basis of the conformity findings for these areas.

SOUTH CENTRAL COAST AIR BASIN – VENTURA COUNTY PORTION

Table 13 8-Hour Ozone (Summer Planning Emissions [Tons/Day])

Pollutant		2014	2020	2030	2035
ROG	Budget	13	13	13	13
	FTIP	9	7	5	5
Budget – FTIP		4	6	8	8
NOx	Budget	19	19	19	19
	FTIP	14	9	6	6
Budget – FTIP		5	10	13	13

SOUTH COAST AIR BASIN

Table 14 8-Hour Ozone (Summer Planning Emissions [Tons/Day])

Pollutant		2014	2017	2020	2023	2030	2035
ROG	Budget	136	119	108	99	99	99
	FTIP	127	113	100	90	76	69
Budget – FTIP		9	6	8	9	23	30
NOx	Budget	277	224	185	140	140	140
	FTIP	257	211	165	124	106	104
Budget – FTIP		20	13	20	16	34	36

Table 15 $PM_{2.5}$ (Annual Emissions [Tons/Day])

Pollutant		2012	2014	2020	2030	2035
ROG	Budget	154	132	132	132	132
	FTIP	146	124	105	73	66
Budget – FTIP		8	8	27	59	66
NO_X	Budget	326	290	290	290	290
	FTIP	308	270	184	111	109
Budget – FTIP		18	20	106	179	181
$PM_{2.5}$	Budget	37	35	35	35	35
	FTIP	35	33	26	18	19
Budget – FTIP		2	2	9	17	16

Table 16 PM10 (Annual Emissions [Tons/Day])

Pollutant		2014	2020	2030	2035
ROG	Budget	251	251	251	251
	FTIP	138	105	79	71
Budget – FTIP		113	146	172	180
NO_X	Budget	549	549	549	549
	FTIP	287	184	126	120
Budget – FTIP		262	365	423	429
PM_{10}	Budget	166	166	166	166
	FTIP	162	154	158	162
Budget – FTIP		4	12	8	4

Table 17 CO (Winter Emissions [Tons/Day])

Pollutant		2015	2020	2030	2035
CO	Budget	2,137	2,137	2,137	2,137
	FTIP	1,219	875	590	523
Budget – FTIP		918	1,262	1,547	1,614

Table 18 NO_2 (Winter Emissions [Tons/Day])

Pollutant		2014	2020	2030	2035
NO_2	Budget	680	680	680	680
	FTIP	306	196	133	126
Budget – FTIP		374	484	547	554

WESTERN MOJAVE DESERT AIR BASIN – ANTELOPE VALLEY PORTION OF LOS ANGELES COUNTY AND SAN BERNARDINO COUNTY PORTION OF MDAB EXCLUDING SEARLES VALLEY

Table 19 8-Hour Ozone (Summer Planning Emissions [Tons/Day])

Pollutant		2014	2020	2030	2035
ROG	Budget	22	22	22	22
	FTIP	13	10	8	8
Budget – FTIP		9	12	14	14
NO_X	Budget	77	77	77	77
	FTIP	34	24	21	22
Budget – FTIP		43	53	56	55

MOJAVE DESERT AIR BASIN – SAN BERNARDINO COUNTY PORTION

Table 20 PM_{10} (Annual Emissions [Tons/Day])

		2014	2020	2030	2035
PM_{10}	No Build	6.1	6.3	7.5	8.3
	Build	5.5	5.8	7.1	7.8
No Build – Build		0.6	0.5	0.4	0.5

MOJAVE DESERT AIR BASIN – SEARLES VALLEY PORTION

Table 21 PM_{10} (Annual Emissions [Tons/Day])

		2014	2020	2030	2035
PM_{10}	No Build	0.1	0.1	0.1	0.1
	Build	0.1	0.1	0.1	0.1
No Build – Build		0.0	0.0	0.0	0.0

SALTON SEA AIR BASIN – COACHELLA VALLEY PORTION

Table 22 8-Hour Ozone (Summer Planning Emissions [Tons/Day])

Pollutant		2012	2014	2020	2030	2035
ROG	Budget	7	7	7	7	7
	FTIP	6	6	5	4	4
Budget – FTIP		1	1	2	3	3
NO_X	Budget	26	26	26	26	26
	FTIP	19	18	12	11	11
Budget – FTIP		7	8	14	15	15

Table 23 PM_{10} (Annual Emissions [Tons/Day])

		2014	2020	2030	2035
PM_{10}	Budget	10.9	10.9	10.9	10.9
	FTIP	8.0	7.6	7.5	7.6
Budget – FTIP		2.9	3.3	3.4	3.3

Note: budget set to one decimal place by 2003 Coachella SIP.

SALTON SEA AIR BASIN – IMPERIAL COUNTY PORTION

Table 24 Ozone (Summer Planning Emissions [Tons/Day])

Pollutant		2014	2020	2030	2035
ROG	Budget	7	7	7	7
	FTIP	5	4	4	4
Budget – FTIP		2	3	3	3
NO_X	Budget	17	17	17	17
	FTIP	13	9	9	10
Budget – FTIP		4	8	8	7

Table 25 PM2.5 (Annual Emissions [Tons/Day])

Pollutant		2014	2020	2030	2035
PM_{10}	No Build	0.9	1.0	1.1	1.2
	Build	0.9	0.9	1.1	1.1
No Build – Build		0.0	0.1	0.0	0.1

Table 26 PM_{10} (Annual Emissions [Tons/Day])

Pollutant		2014	2020	2030	2035
PM_{10}	No Build	3.7	4.4	4.9	5.2
	Build	3.5	4.1	4.6	4.8
No Build – Build		0.2	0.3	0.3	0.4

DETAILED EMISSIONS ANALYSES

The following tables present further detail of the emissions analyses for all non-attainment and maintenance areas within SCAG's jurisdiction.

SOUTH CENTRAL COAST AIR BASIN – VENTURA COUNTY PORTION

Table 27 8-Hour Ozone (Summer Planning Emissions [Tons/Day])

Pollutant		2014	2020	2030	2035
ROG	2013 FTIP	8.6	6.8	5.0	4.3
Total Emissions		9	7	5	5
Emission Budget		13	13	13	13
Budget – Emissions		4	6	8	8
NOx	2013 FTIP	13.2	8.6	5.8	5.2
Total Emissions		14	9	6	6
Emission Budget		19	19	19	19
Budget – Emissions		5	10	13	13

SOUTH COAST AIR BASIN

Table 28 8-Hour Ozone (Summer Planning Emissions [Tons/Day])

Pollutant	2014	2017	2020	2023	2030	2035
ROG 2013 FTIP	141.4	125.1	108.9	97.7	81.9	73.8
Adjustments for Adopted State and Local On-road Measures*	-0.6	-0.9	-1.1	-1.5	-1.5	-1.5
State Strategy - On-road Reductions*	-14.2	-11.5	-8.5	-6.2	-4.8	-4.3
Sum	126.6	112.7	99.3	90.0	75.6	68.0
Total Emissions	127	113	100	90	76	69
Emission Budgets	136	119	108	99	99	99
Budget – Emissions	9	6	8	9	23	30
NOx 2013 FTIP	280.4	230.4	180.1	155.1	123.7	118.3
Adjustments for Adopted State and Local On-road Measures*	-1.4	-1.0	-0.1	-0.1	-0.1	-0.1
State Strategy - On-road Reductions*	-22.3	-18.8	-15.6	-31.9	-18.5	-14.9
Sum	256.9	210.6	164.4	123.1	105.1	103.3
Total Emissions	257	211	165	124	106	104
Emission Budgets	277	224	185	140	140	140
Budget – Emissions	20	13	20	16	34	36

** Provided by ARB. The detailed Ozone emission budgets were provided by ARB on March 8, 2012 (Table 28A).*

TABLE 28A South Coast Ozone Plan Transportation Conformity Budgets (Summer Planning Emissions [Tons/Day])

Summer Planning Emissions [Tons per day]						
South Coast Air Basin - ROG	**2014**	**2017**	**2020**	**2023**	**2030**	**2035**
Baseline Emissions (EMFAC 2007 Default)	150.1	131.1	117	106.1		
Adjustments for Adopted State and Local On-road Measures	**-0.6**	**-0.9**	**-1.1**	**-1.5**	**-1.5**	**-1.5**
AB1493	-0.4	-0.8	-1.1	-1.5	-1.5	-1.5
Moyer (on-road portion)	-0.1	-0.1	0.0	0.0	0.0	0.0
State Strategy - On-road Reductions* (Estimated)	**-14.2**	**-11.5**	**-8.5**	**-6.2**	**-4.8**	**-4.3**
Smog Check	*-4.9*	-4.4	-3.8	-2.8	-2.8	-2.8
Reformulated Gasoline	*-4.4*	-3.7	-3.0	-2.5	-2.5	-2.5
Cleaner in use HD Diesel Trucks	*-4.9*	-3.5	-1.7	-0.9	0.5	1.0
Proposed Local Strategy - On-road Reductions						
SUM	135.2	118.8	107.4	98.4		
Budget	**136**	**119**	**108**	**99**		
South Coast Air Basin - NOx	**2014**	**2017**	**2020**	**2023**	**2030**	**2035**
Baseline Emissions (EMFAC 2007 Default)	299.9	243.5	200.2	171.8		
Adjustments for Adopted State and Local On-road Measures	**-1.4**	**-1.0**	**-0.1**	**-0.1**	**-0.1**	**-0.1**
AB1493						
Moyer (on-road portion)						
State Strategy - On-road Reductions*	**-22.3**	**-18.8**	**-15.6**	**-31.9**	**-18.5**	**-14.9**
Smog Check	-2.6	-2.2	-1.7	-1.2	-1.2	-1.2
Cleaner in use HD Diesel Trucks	*-19.7*	-16.7	-13.9	-30.7	-17.3	-13.7
Proposed Local Strategy - On-road Reductions						
SUM	276.3	223.6	184.5	139.8		
Budget	**277**	**224**	**185**	**140**		

Table 29 $PM_{2.5}$ (Annual Emissions [Tons/Day])

Pollutant		2012	2014	2020	2030	2035
ROG	2013 FTIP	154.2	137.5	104.8	78.5	70.9
Adjustment for Adopted State and Local On-road Measures*		-0.4	-0.6	n/a	-1.5	-1.5
State Strategy-On-road Reductions*		-8.7	-13.6	n/a	-4.8	-4.3
Sum		145.1	123.3	104.8	72.2	65.1
Total Emissions		146	124	105	73	66
Emission Budget		154	132	132	132	132
Budget – Emissions		8	8	27	59	66
NO_X	2013 FTIP	332.3	286.1	183.4	125.4	119.5
Adjustment for Adopted State and Local On-Road Measures*		-1.4	-1.4	n/a	-0.1	-0.1
State Strategy – On-road Reductions*		-23.7	-15.1	n/a	-15.1	-11.2
Sum		307.2	269.6	183.4	110.2	108.2
Total Emissions		308	270	184	111	109
Emission Budget		326	290	290	290	290
Budget – Emissions		18	20	106	179	181
$PM_{2.5}$	2013 FTIP	15.6	15.2	14.1	14.0	14.2
Re-entrained Road Dust Paved		19.1	19.4	19.8	21.4	21.9
Re-entrained Road Dust Unpaved *		1.0	1.0	1.0	1.0	1.0
Road Construction Dust *		0.2	0.2	0.2	0.2	0.2
Adjustment for Adopted State and Local On-road Measures*		-0.1	-0.2	n/a	-0.3	-0.3
State Strategy – On-road Reductions*		-1.4	-2.8	n/a	-0.5	-0.3
Adjustment from NO_X to $PM_{2.5}$ Trading**		N/A	N/A	-10.6	-17.9	-18.1
Sum		34.4	32.8	25.5	17.9	18.6
Total Emissions**		35	33	26	18	19
Emission Budget		37	35	35	35	35
Budget – Emissions		2	2	9	17	16

** The detailed $PM_{2.5}$ emission budgets were provided by ARB on March 8, 2012 (Table 29A).*

*** The Plan $PM_{2.5}$ emissions for years after 2014 are calculated with the NO_X to $PM_{2.5}$ (10 to 1) trading mechanism as approved by EPA on November 9, 2011*

TABLE 29A South Coast PM2.5 Plan Transportation Conformity Budgets (Annual Emissions [Tons/Day])

South Coast Air Basin – ROG	**2012**	**2014**	**2023**	**2030**	**2035**
Baseline Emissions (EMFAC 2007 Default)	162.6	146.1			
Adjustments for Adopted State and Local On-road Measures	-0.4	-0.6	-1.5	-1.5	-1.5
AB1493	-0.2	-0.4	-1.5	-1.5	-1.5
Moyer (on-road portion)	-0.1	-0.1	0.0	0.0	0.0
State Strategy - On-road Reductions* (Estimated)	-8.7	-13.6	-6.2	-4.8	-4.3
Smog Check	0.0	-4.7	-2.8	-2.8	-2.8
Reformulated Gasoline	-4.2	-3.9	-2.3	-2.3	-2.3
Cleaner in use HD Diesel Trucks	-4.5	-5.0	-1.1	0.4	0.8
Proposed Local Strategy – On-road Reductions					
SUM	153.5	131.9			
Budget	154	132			
South Coast Air Basin - NO_X	**2012**	**2014**	**2023**	**2030**	**2035**
Baseline Emissions (EMFAC 2007 Default)	350.8	305.7			
Adjustments for Adopted State and Local On-road Measures	-1.4	-1.4	-0.1	-0.1	-0.1
AB1493	0.0	0.0	-0.1	-0.1	-0.1
Moyer (on-road portion)	-1.4	-1.4	0.0	0.0	0.0
State Strategy – On-road Reductions*	-23.7	-15.1	-28.8	-15.1	-11.2
Smog Check	0.0	-2.7	-1.2	-1.2	-1.2
Cleaner in use HD Diesel Trucks	-23.7	-12.4	-27.6	-13.9	-10.0
Proposed Local Strategy – On-road Reductions					
SUM	325.6	289.2			
Budget	326	290			
South Coast Air Basin – $PM_{2.5}$	**2012**	**2014**	**2023**	**2030**	**2035**
Baseline Emissions (EMFAC 2007 Default)	17.5	17.2			

South Coast Air Basin – ROG	**2012**	**2014**	**2023**	**2030**	**2035**
Paved Road Dust	18.8	19.0			
Un-paved Road Dust	1.0	1.0	1.0	1.0	1.0
Road Construction Dust	0.2	0.2	0.2	0.2	0.2
Adjustments for Adopted State and Local On-road Measures	-0.1	-0.2	-0.3	-0.3	-0.3
AB1493	0.0	-0.2	-0.3	-0.3	-0.3
Moyer (on-road portion)	-0.1	-0.1	0.0	0.0	0.0
State Strategy – On-road Reductions*	-1.4	-2.8	-1.1	-0.5	-0.2
Smog Check	0.0	-0.2	-0.2	-0.2	-0.2
Cleaner in use HD Diesel Trucks	-1.4	-2.6	-0.9	-0.3	0.0
Proposed Local Strategy – On-road Reductions					
SUM	36.1	34.5			
Budget	37	35			

Table 30 PM_{10} (Annual [Tons/Day])

Pollutant		2014	2020	2030	2035
ROG	2013 FTIP	137.5	104.8	78.5	70.9
Total Emissions		138	105	79	71
Emission Budget		251	251	251	251
Budget – Emissions		113	146	172	180
NO_X	2013 FTIP	286.1	183.4	125.4	119.5
Total Emissions		287	184	126	120
Emission Budget		549	549	549	549
Budget – Emissions		262	365	423	429
PM_{10}	2013 FTIP	22.1	21.1	21.4	21.7
Re entrained Road Dust		128.3	130.8	141.5	145.3
Re entrained Road Dust		8.7	8.7	8.7	8.7
Road Construction Dust*		2.2	2.2	2.2	2.2
AQMD Backstop**		0.0	-9.0	-16.0	-16.0
Sum		161.3	153.8	157.8	161.9
Total Emissions		162	154	158	162
Emission Budget		166	166	166	166
Budget – Emissions		4	12	8	4

**Provided by SCAQMD.*
***AQMP Backstop Measure: There is projected long-term growth in direct PM10 emissions due to increased vehicle travel on paved and unpaved roads. To address this increase in primary PM10 emissions from travel while continuing to provide for attainment after 2006, the 2003 AQMP included the "Transportation Conformity Budget Backstop Control Measure" which commits to achieve additional PM10 reductions from transportation-related PM10 source categories in future years to offset the increased emissions.*

Table 31 CO (Winter Emissions [Tons/Day])

Pollutant		2015	2020	2030	2035
CO	2013 FTIP	1219.0	874.1	589.6	522.7
Total Emissions		1,219	875	590	523
Emission Budgets		2,137	2,137	2,137	2,137
Budget – Emissions		918	1,262	1,547	1,614

Table 32 NO_2 (Winter Emissions [Tons/Day])

Pollutant		2014	2020	2030	2035
NO_2	2013 FTIP	305.8	195.1	132.2	125.6
Total Emissions		306	196	133	126
Emission Budgets		680	680	680	680
Budget – Emissions		374	484	547	554

WESTERN MOJAVE DESERT AIR BASIN – ANTELOPE VALLEY PORTION OF LOS ANGELES COUNTY AND SAN BERNARDINO COUNTY PORTION OF MDAB EXCLUDING SEARLES VALLEY

Table 33 8-Hour Ozone (Summer Planning Emissions [Tons/Day])

Pollutant		2014	2020	2030	2035
ROG	2013 FTIP	12.1	9.4	7.9	7.7
Total Emissions		13	10	8	8
Emission Budget		22	22	22	22
Budget – Emissions		9	12	14	14
NOx	2013 FTIP	33.2	23.2	20.0	21.9
Total Emissions		34	24	20	22
Emission Budget		77	77	77	77
Budget – Emissions		43	53	57	55

MOJAVE DESERT AIR BASIN – SAN BERNARDINO COUNTY PORTION

Table 34 PM_{10} (Annual Emissions [Tons/Day])

Pollutant		2014	2020	2030	2035
PM_{10}	2013 FTIP No-Build				
Re-entrained Road Dust		4.0	4.4	5.3	5.8
Motor Vehicle		2.2	2.0	2.3	2.6
Total Emissions		6.2	6.4	7.6	8.4
PM_{10}	2013 FTIP Build				
Re-entrained Road Dust		3.9	4.5	5.3	5.6
Paving Unpaved Roads		-0.6	-0.6	-0.4	-0.3
Motor Vehicle		2.2	2.0	2.2	2.6
Total Emissions		5.5	5.9	7.1	7.9
No Build – Build		0.7	0.5	0.5	0.5

MOJAVE DESERT AIR BASIN – SEARLES VALLEY PORTION

Table 35 PM_{10} (Annual Emissions [Tons/Day])

Pollutant		2014	2020	2030	2035
PM_{10}	No Build	0.1	0.1	0.1	0.1
	Build	0.1	0.1	0.1	0.1
No Build – Build		0.0	0.0	0.0	0.0

SALTON SEA AIR BASIN – COACHELLA VALLEY PORTION

Table 36 8-Hour Ozone (Summer Planning Emissions [Tons/Day])

Pollutant		2012	2014	2020	2030	2035
ROG	2013 FTIP	5.8	5.2	4.2	3.5	3.4
Total Emissions		6	6	5	4	4
Emission Budget		7	7	7	7	7
Budget – Emissions		1	1	2	3	3
NO_X	2013 FTIP	20.7	17.9	11.8	10.1	10.6
Baseline Adjustment *		-2.0	0.0	0.0	0.0	0.0
Sum		18.3	17.9	11.8	10.1	10.6
Total Emissions		19	18	12	11	11
Emission Budget		26	26	26	26	26
Budget – Emissions		7	8	14	15	15

** Provided by ARB.*

Table 37 PM_{10} (Annual [Tons/Day])

Pollutant		2014	2020	2030	2035
PM_{10}	2013 FTIP	1.1	1.0	1.1	1.2
Re-entrained Road Dust Paved		3.1	3.3	3.5	3.6
Re-entrained Road Dust		3.7	3.3	2.8	2.8
Road Construction Dust *		0.1	0.1	0.1	0.1
Total Emissions		8.0	7.6	7.5	7.7
Emission Budget		10.9	10.9	10.9	10.9
Budget – Emissions		2.9	3.3	3.4	3.2

** Provided by SCAQMD.*

SALTON SEA AIR BASIN – IMPERIAL COUNTY PORTION

Table 38 8-Hour Ozone (Summer Planning Emissions [Tons/Day])

Pollutant		2014	2020	2030	2035
ROG	2013 FTIP	4.5	3.7	3.5	3.6
Total Emissions		5	4	4	4
Emission Budget		7	7	7	7
Budget – Emissions		2	3	3	3
NO_X	2013 FTIP	12.2	8.7	8.8	9.5
Total Emissions		13	9	9	10
Emission Budget		17	17	17	17
Budget – Emissions		4	8	8	7

Table 39 $PM_{2.5}$ (Annual [Tons/Day])

Pollutant		2014	2020	2030	2035
$PM_{2.5}$	2013 FTIP No-Build				
Re-entrained Road Dust		0.5	0.6	0.6	0.7
Motor Vehicle		0.5	0.4	0.5	0.5
Total Emissions		1.0	1.0	1.1	1.2
$PM_{2.5}$	2013 FTIP Build				
Re-entrained Road Dust		0.4	0.5	0.6	0.6
Motor Vehicle		0.5	0.4	0.5	0.5
Total Emissions		0.9	0.9	1.1	1.1
No Build – Build		0.1	0.1	0.0	0.1

Table 40 PM_{10} (Annual [Tons/Day])

Pollutant		2014	2020	2030	2035
PM_{10}	2013 FTIP No-Build				
Re-entrained Road Dust		3.1	3.8	4.2	4.4
Motor Vehicle		0.6	0.6	0.7	0.8
Total Emissions		3.7	4.4	4.9	5.2
PM_{10}	2013 FTIP Build				
Re-entrained Road Dust		2.9	3.6	3.9	4.0
Motor Vehicle		0.6	0.6	0.7	0.8
Total Emissions		3.5	4.2	4.6	4.8
No Build – Build		0.2	0.2	0.3	0.4